

114

STANLEY'S CASE OF PATENT URACHUS,
WITH OBSERVATIONS ON URACHAL CYSTS.

BY

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WHEN preparing—a year since—a memoir based upon a case in my own operative practice,¹ I was struck by a certain resemblance between Specimen 2419 in the Pathological Collection in the Museum attached to St. Bartholomew's Hospital and a report of a case under the late Mr. Stanley's care, published by him in the third volume of the Transactions of the Pathological Society of London. There is no mention either of that report, or even of the bare name of Stanley, in the note on No. 2419 in the Museum Catalogue, but that valuable publication, on the other hand, names Savory as the describer of the specimen, and refers us to the second volume of the first part of the Transactions of the Abernethian Society; yet in those now venerable archives I find no note either of Mr. Stanley or of his report.

After a troublesome search amidst original documents, in which labour I was greatly assisted by Dr. Morley Fletcher, I have come to the conclusion that the two cases are identical. As the subject specially concerns St. Bartholomew's Hospital, and is interesting in itself, I think that a copy of the aforesaid documents ought to find a place in the Reports, so as to save trouble to those who may work in future at diseases of the urachus. Otherwise the copies of the documents in my possession would remain forgotten in my note-books. This statement requires a little further explanation. The contribution which I prepared for the Royal Medical and Chirurgical Society was not a treatise on diseases of the urachus, but a clinical paper on true urachal cysts. I briefly sketched, however, allied affec-

¹ A Case of Cyst of the Urachus, with notes on Urachal and so-called "Allantoic Cysts" (Medico-Chir. Trans., vol. lxxxi. 1898). This paper includes numerous references.

tions, such as urachal fistula and patulous urachus, and this sketch involved some notice of Stanley's case. In looking up that case, I came across the difficulties above noted, whilst, after all my trouble, I had to content myself with a short statement of the discrepancies in the original documents. Whilst, then, there was no place for a full copy of the documents in my memoir on cysts of the urachus, I think that such a copy is suitable for insertion in the St. Bartholomew's Hospital Reports.

I will therefore begin by comparing the documents. Afterwards I will say something on the study of the urachus and its diseases.

By "the documents" I mean—

(1.) The original report, signed by Stanley, in the Transactions of the Pathological Society, vol. iii. p. 127.

(2.) The note on No. 2419 in the Museum Catalogue.

(3.) The original MSS. report on Stanley's case, written by Dr. Kirkes, as "transcribed from Mr. Stanley's private notes."

(4.) The report of the exhibition of No. 2419 at a meeting of the Abernethian Society. As in (2), the only name mentioned is that of Savory.

(1.) From the first to the current volume of the Transactions of the Pathological Society, I find no contribution devoted to patulous urachus or urachal cyst. The paper in vol. iii. to which I refer is headed "Polypous Excrescences of the Bladder," without any mention of patulous urachus. The latter condition is, however, noted in the Society's Index to vols. i.—xv. as "Pervious Urachus," and from this reference I found out the paper, which I reproduce below.

"Polypous Excrescences of the Bladder."

"These tumours grew from the mucous membrane of the bladder of a male child, aged two years. The child had for several months suffered from irritation in the bladder; the character of the symptoms being such as to lead to the suspicion of the existence of stone; and in consequence repeated examinations of the bladder, by the sound, were made, but no stone discovered. About a month before death, the walls of the abdomen, through the hypogastrie (*sic*) region, became tense and acutely painful, and at a point just below the umbilicus, fluctuation being, after a little while, discovered, a puncture of the integuments was here made; from the aperture there issued first some fluid resembling urine, and then about

two ounces of pus. From this time to the child's death the whole of the urine was discharged through the opening in the abdominal walls, none passing through the urethra; but this was accompanied by gradual sinking of the vital powers.

"On examining the body, numerous soft, membranous pedunculated growths from the mucous membrane of the bladder were found projecting into, and in great part filling its cavity. An abscess had formed between the recti-muscles and peritoneal lining of the abdominal walls. This abscess extended from the umbilicus downwards to the fundus of the bladder. The tube of the urachus was pervious, and it opened into the cavity of the abscess; whilst at its upper part the abscess communicated with the aperture which had been made by puncture in the abdominal walls. The kidneys were much hypertrophied.—*Mr. Stanley, May 6, 1851.*"

This report has seldom if ever been quoted. It is otherwise with the Catalogue note of the specimen in the Museum, which has quite recently been referred to by Mr. John Morgan.¹

(2.) Hence I have introduced the Catalogue note here—

"A Descriptive Catalogue of the Anatomical and Pathological Museum of St. Bartholomew's Hospital.

"2419. A bladder laid open by vertical incision through its anterior wall. A pedunculated growth is attached to its inner surface, stretching transversely across the fundus of the bladder, immediately behind the apertures of the ureters, which are much dilated. The mass is attached at either side, but free in the centre, and was so situated that it might lie forward over the urethral orifice, or be propelled in that direction when attempts were made to void the urine. The tumour, irregularly lobulated, consists of a fine filamentous structure, scattered through a granular substance, and invested by a quantity of tessellated epithelium. The walls of the bladder are much thickened. At its upper surface the cavity of an abscess commences and extends to the umbilicus, but no communication can be traced between the two, although the urine continued to escape by the abscess up to the time of the child's death. The small papilla close to the vesical termination of the abscess is all that appears of the urachus. A bristle passed some way down it, but could not, without violence, be forced into the bladder.

¹ "Lettsonian Lectures," Lecture III., *Lancet*, March 12, 1898, p. 710.

"From a child who had suffered for eight weeks from extreme pain during micturition, presently followed by severe pain in the abdomen. A swelling formed about the umbilicus, softened, and was opened with a lancet, some healthy pus escaping. Urine began to dribble away from this opening, scarcely any escaping from the natural channel. The child, after lingering in a wretched state for some days, died. The case is described by Mr. Savory in the Transactions of the Abernethian Society, Part I. vol. ii."

Thus the late Sir William Savory bears the honour of having investigated this specimen. The note further suggests that he was the operator. We will now turn back, however, to another document by Stanley, where we indeed find a junior coadjutor, but he was not Savory, but Kirkes, so familiar to the student of physiology.

(3.) Let it be remembered when the following note is compared with (1) and (2), that (2) has been re-written by later curators of the Museum, and that is the reason why we do not find the antiquated expression "polypous excrescences." On the other hand, (1) and (3) having been written under Stanley's superintendence, there has been no corruption of text for the benefit of science in accordance with advanced ideas in pathology. Corruption of text, though one of the worst of literary sins, is often an absolute necessity in science; but in the present case we have more to do with literary than with scientific evidence.

From the MSS. "Reports of Cases in St. Bartholomew's Hospital,"
vol. v. p. 485.

"CASE XCVII.—(*No Name*), *age 2.*—*Disease*—Polypons excrescences growing from the mucons membrane of the bladder in a child. For several months the child had suffered from symptoms of stone in the bladder. I (Mr. Stanley) sounded it, but discovered no stone. The symptoms of irritation of the bladder continued, with no abatement, through the next month, then there occurred an extremely painful tension of the parietes of the abdomen, through the hypogastric region. When my attention was first directed to this condition of the abdomen, I thought its cause might be an over-distension of the bladder; accordingly, I introduced a catheter and found only a small quantity of urine in the bladder. The pain and tension of the walls of the abdomen were soon afterwards accompanied by a fluctuation just below the umbilicus. Accordingly, I here punctured the integuments, and from the opening

there issued first some fluid of the appearance of urine, then about two ounces of matter. From the opening urine continued to flow so freely, and in such quantity, that the whole of it took this course, none passing by the urethra. From the time the opening in the abdominal walls was made, the child gradually sank, and in a few weeks afterwards died.

“On examining the body after death, the bladder was found much hypertrophied in its muscular and mucous coats. Its cavity contracted, and more than half-filled by a mass of soft, polypous excrescences of the bulk of a walnut, this mass being made up of many pendulous projections from the mucous membrane of the bladder, especially around its neck. These projections were of a rounded figure, varying from half an inch to one inch and a half in length, and about the thickness of a quill. Their free surfaces were smooth, and apparently continuous with the mucous membrane of the bladder. The opening in the abdominal walls led to an abscess between the recti-muscles and the peritoneum. At the lowest point of this abscess the end of the urachus was seen projecting from the fundus of the bladder.

“The tube of the urachus was free to the bladder, but no passage could be clearly traced from the urachus through the coats of the bladder into its cavity. The right kidney was twice its natural size, with deposits apparently of urine in its interior. The left kidney was also hypertrophied, being about one-third larger than natural.”

“Mr. Stanley remarks, ‘There can be no question respecting the order of the phenomena in this case. The polypous growth in the bladder, especially around the neck, would obstruct the flow of urine into the urethra, and thus give rise to the symptoms of stone. The bladder thus rendered irritable, and called upon to make more than the usual efforts for the expulsion of urine, became hypertrophied. Then, as a further consequence of the obstruction to the exit of urine from the bladder, the urachus re-opened. The further explanation of the phenomena must be conjectured, with, however, but little doubt of their correctness, to the following effect—that the urachus re-opening, as it has done in other instances of obstruction, from any cause, to the exit of urine from the bladder, that thus becoming distended with urine, it (the urachus) had given way, permitting the escape of urine into the cellular tissue between the recti-muscles and the peritoneum, hence the formation of the abscess which I opened, and through which the urine passed to the opening in the parietes. The only difficulty or hitch in this explanation occurred in the not find-

ing the continuation of the tube of the urachus through the coats of the bladder into its cavity. Although great pains were taken to discover this channel, it could not be found. Still, however, I am convinced of its existence as the outlet of the urine from the bladder into the cavity of the abscess in the abdominal parietes, and thence through the outward opening just below the umbilicus. It should have been noted that the ureters were much dilated, but otherwise unaltered.'—Transcribed from Mr. Stanley's private notes.—*W. S. Kirkes.*"

(4.) But turning back to Savory, we find that in the written archives of the Abernethian Society his name alone is associated with the case. Thus manuscript and printed evidence are equally divided between the two great St. Bartholomew's surgeons.

From "Transactions of the Abernethian Society," Part I. vol. ii.

This is the report of a meeting of that Society, held on October 30, 1850, Mr. Luther Holden, President, in the chair. As Dr. Morley Fletcher pointed out to me, the date is five months later than that of the reading of Stanley's paper before the Pathological Society (May 6th).

"Mr. Savory related the particulars of a case of polypus of the bladder. The President observed that in the case here related there was no passage discovered between the bladder and the urachus, although urine had escaped during life from the umbilicus. The Secretary related the particulars of a similar case recorded by the late Mr. Crosse of Norwich."

A short but expressive note. Once more, in an original document, we find such a term as "polypus of the bladder." Observe that the age is only given in (1) and (3), both Stanley's reports.

There can be little doubt that specimen 2419 is from Stanley's case. There are a few discrepancies in the above reports, but they tend to show that (2) and (4) were less perfect clinical records, as there is no mention about suspicion of stone and sounding, as in (1) and (3). In (2) the patient is said to have died "some days" after the incision was made, but according to Stanley's report (3) he survived for "a few weeks;" most probably the error is in (2). In (2), however, as well as (1) and (3), it is recorded that there was a patulous urachus which opened into the abscess, so that urine entered it from the bladder, and that the urine escaped from the incision made

surgically at or near the umbilicus, and not, we may presume, before Stanley used the knife. In other words, the umbilical end of the urachus was not previously patulous. Mr. Holden's observation in (4) gives the reader an opposite impression, but most probably his remarks have been carelessly abbreviated, so that "after incision" should have followed the words "from the umbilicus." All the reports, however, agree that there were morbid growths in the bladder, and Stanley in (3) agrees with (2) and (4). Thus though urine flowed though the incision before death, no passage could be clearly traced from the patulous urachus through the coats of the bladder into its cavity. He does not, by the way, distinctly state this fact in (1), but (3) is evidently the fuller report. I shall dwell presently on this remarkable phenomenon, which has been observed more than once, and must be remembered when a true urachal cyst is treated by operation. The above discrepancies, I need only say at present, are insufficient to prove that the four documents do not refer to one and the same case. Two cases so very similar would hardly be seen within five months even in a great hospital. The specimen must have been exhibited by Savory at the Abernethian Society on Stanley's recommendation or permission.

A few remarks on diseases of the urachus in general may not be out of place.

The comparative anatomy and embryology of the urachus are well known. On the other hand, many statements relating to the anatomy of the human urachus have been taken too much upon trust. In the same manner urachal fistula has been well studied, and clinical records of that condition seem usually accurate, whilst the most extravagant legends (for they can hardly be called clinical histories) are extant in relation to urachal cysts.

THE URACHUS IN MAN.

The Sheath.—We were taught in Gray's "Anatomy" (5th edition), that the summit of the bladder "is connected to the umbilicus by a fibro-muscular cord, the urachus." Farther on we learn that the "urachus is the fibro-muscular cord already mentioned, extending between the summit of the bladder and the umbilicus. It is broad below at its attachment to the bladder, and becomes narrower as it ascends."

This teaching is not strictly accurate. Gray speaks of the sheath of the urachus as though it meant all that is understood by the word "urachus," and says nothing about its canal.

So we were taught thirty years ago. In the 14th edition of Gray's "Anatomy" I find the following paragraph on the subject:—

"The urachus is the obliterated remains of a tubular canal which exists in the embryo, and connects the cavity of the bladder with a membranous sac placed external to the abdomen, opposite the umbilicus, called the allantois. It passes upwards from the apex of the bladder between the transversalis fascia and peritoneum to the umbilicus, becoming thinner as it ascends. It is composed of fibrous tissue mixed with plain muscular fibres. On each side of it is placed a fibrous cord, the obliterated portion of the hypogastric artery, which, passing upwards from the side of the bladder, approaches the urachus above its summit. In the infant at birth, it is occasionally found pervious, so that the urine escapes at the umbilicus, and calculi have been found in its canal."

Here, as in earlier editions, the sheath is described as the canal. Luschka many years ago distinguished the canal as the essential part of the urachus. The expression "obliterated remains" is at variance with Wutz's careful researches, which seem to show that the canal is, as a rule, partially pervious. The allusion to the allantois is misleading, giving the idea that the urachus is something quite different from the allantois. At page 86, in the same edition, the relations are described correctly—"A portion of the allantoic vesicle within the body-cavity is eventually destined to form the bladder, while the remainder forms an impervious(?) cord, the urachus, stretching from the summit of the bladder to the umbilicus."

Nevertheless, the sheath is the most essential part of the urachus in the human adult. Its upper part is chiefly tendinous, its middle and lower third mainly muscular. The great majority of the muscular fibres, all of the plain variety, run vertically. Two microscopical drawings of the sheath of the urachus will be found in my contribution published in the eighty-first volume of the *Medico-Chirurgical Transactions*.

This fibro-muscular cord may, it seems, be the primary seat of a new growth. One very distinct case has been reported, but from some reason not very clear, it is usually classified with cysts of the urachus in text-books.

I will reproduce here the original report:—

"Dr. Aveling exhibited a sub-peritoneal tumour which grew in the anterior abdominal wall, and reached from two inches above the umbilicus to the pubes. It was removed post-mortem, the patient having died after an exploratory operation."¹

¹ Brit. Gynæc. Journ., vol. ii. 1887, p. 56.

According to Mr. Bland Sutton's report,¹ this tumour weighed four pounds and three-quarters. It was multilocular, the outer part was made up of unstriped muscular fibres, the inner of spindle-cells, with loculi formed by mucoid degeneration. The tumour is figured. There is no report of its connection with the bladder, but Mr. Sutton informs me that it was certainly part of the urachus. In fact, there seems little doubt as to its origin and nature. It was a myxo-sarcoma of the sheath of the urachus.

Thus, on the authority of Sutton, a myxo-sarcoma of the sheath of the urachus has been observed. On the other hand, it is doubtful whether a myxo-sarcoma of the urachus has ever been seen. Specimen 417B in the Museum of the College of Surgeons shows a large myxo-fibroma (or myxo-sarcoma) attached to the apex of the bladder of a male child aged sixteen months. "The tumour," says the Catalogue, "probably originated from the urachus." Mr. Targett has, however, revised the Catalogue, and asks for the erasure of this sentence. He writes to me that the tumour "originated from the pericystic connective tissue, and happened to be at the apex of the bladder. There is not the slightest reason for attributing it to the urachus. No doubt that structure was destroyed by it. I have seen two other similarly placed sarcomata of the bladder in children, beside the cases given in my paper. Indeed, any part of the extra-peritoneal cellular tissue may become the seat of these soft myxo-sarcomata in children, and their relations to viscera are thus accidental."

The case in question was under the care of Dr. Lauder Brunton, and the necropsy was made by Dr. Leonard Guthrie, who informs me that the tumour "was seen to be connected with the upper part of an elongated but seemingly normal bladder. The remains of the right hypogastric artery coursed up the side of the bladder, and ended in the mass above." A short notice of this case will be found in Mr. Targett's monograph, "On Sarcomata of the Bladder and their Classification."²

The experience of so sound a pathologist as Mr. Targett must warn us against making too sure of the seat of origin of any large solid tumour in the region of the urachus. Mr. Sutton's myxo-sarcoma, on the other hand, is very probably a tumour of authentic urachial origin.

The Canal of the Urachus—Wutz's Valve.—In 1883 a painstaking German anatomist examined seventy-four post-mortem subjects, and found that the canal of the urachus is, in part

¹ Brit. Gynec. Journ., vol. ii. 1887, p. 187.

² Trans. Path. Soc., vol. xlvii. p. 311, second paragraph.

at least, constant, epithelial lining and all.¹ In twenty-four there were distinct cystic dilatations of the urachus, and in two of these cases the cysts had suppurated owing to septic disease elsewhere.

Wutz found that the tubular epithelial portion of the urachus normally continues growing up to about the twenty-fifth year, the canal becoming wider. It does not grow so fast as the adjacent structures, so that, as the subject grows older, its upper limit recedes from the direction of the umbilicus. The epithelium, irregular in form, is stratified below, but reduced to one layer above.² In the sub-epithelial connective tissue is, according to Wutz, a layer of plain muscle-cells. It is most probable that the muscular capsule of a urachal cyst is developed from this layer, rather than from the sheath.

The most important discovery for which we are indebted to Wutz is the existence of a transverse valvular fold at the vesical orifice of the urachal canal. It is of high pathological, clinical, and surgical importance, and deserves to be distinguished as Wutz's valve. The phenomenon of the escape of urine into the urachal canal, when there is obstruction to the exit of urine from the urethra, as in Stanley's case, the subject of this paper, seems to imply that there is such a valve, and that it can be forced. The same fact seems further established by the sudden escape of urine from a surgical incision made into a true cyst of the urachus, when at, and for some time after the operation there was no evidence of any urine entering the cyst.

I cannot say, however, that the anatomy of Wutz's valve has been satisfactorily determined. Ample material is at hand at St. Bartholomew's Hospital for thorough research into the anatomy of the human urachus. I should rejoice to study the record of good work done in such a field. At present, we must content ourselves by agreeing that a urachal canal may exist, and that something certainly prevents urine from entering that canal from the bladder, though occasionally it fails to do so. That Wutz is right in making out that that something is a valvular fold of mucous membrane there can be little doubt.³

¹ "Ueber Urachus und Urachuscysten," Virchow's Archiv, vol. xcii. 1883, p. 387.

² Want of space forbids me from dwelling on the epithelium of the urachus and its cysts.

³ "On inspecting the inner aspect of the vesical mucous membrane at the point where the urachus begins, it will be seen, in most cases, on stretching the tissues a little, that a funnel-shaped depression exists, at the apex of which is a narrow opening." In two of Wutz's seventy-four cases there was no opening; in twenty-one the orifice seemed closed, but a bristle could be passed from the urachus into the bladder. In fifty-one the bristle could be introduced through the opening in the vesical mucous membrane into the urachal canal; but even in these cases there was a certain resistance, as though there were a valve over the narrow opening, "which

Cannot that little be cleared away by our demonstrators, registrars, and pathologists?

The valve, or whatever it ought strictly to be called, explains how, in Stanley's case, "in consequence of the obstruction to the exit of urine from the bladder, the urachus re-opened." Stanley's experience is not unique.¹

Urachal Fistula, Complete and Incomplete.—The complete form includes all cases where the canal of the urachus is not only open throughout, but also opens into the bladder below, and on the skin of the umbilicus above. The incomplete form, where the umbilicus is not patulous, but the dilated canal opens into the bladder, includes Stanley's case. This variety is closely allied to another condition, true cyst of the urachus communicating with the bladder. The two conditions cannot always be distinguished, for leakage of urine may certainly dilate the urachal canal till it forms a true cyst, whilst a cyst may develop in the urachal canal, and afterwards communicate with the bladder.

The most typical example of complete urachal fistula is Paget of Worcester's "Case in which the Urachus remained open, and a ring-shaped Calculus, formed on a hair in the Bladder, was extracted through the Umbilicus."² Many other instances of complete fistula have been recorded.

Stanley's case is a good sample of the incomplete variety. The patient was very young, and it is just in such cases that we find evidence that the urine forced into the urachus from the bladder is the primary, direct, and indeed sole cause of the dilatation of the urachus.

Among the cases doubtful in the sense explained above, I may note George Morgan's, where the patient was a boy aged five, and David Newman's of Glasgow, where the patient was a man aged thirty-nine.³ In both cases the cyst was incised and drained, in both urine escaped for awhile from the incision, and in both the incision ultimately healed. Judging from the facts of each case, the cyst in the first instance was most probably developed through the entry of urine into the urachus abnormally patulous at its vesical extremity. This condition might explain the second, though it is also probable that a cyst developed in the urachus, and acquired a communication with the bladder

seemed to be formed by a transverse fold of the mucous membrane." Dr. Leonard Guthrie observed a "slight dimple or depression," indicating inside the bladder the site of a urachus otherwise obliterated (Case of Congenital Deficiency of the Abdominal Muscles, Trans. Path. Soc., vol. xlvii. p. 139).

¹ Here I must note that diverticula of the bladder near its apex must be distinguished from patulous urachus.

² Med. Chir. Trans., vol. xxxiii. 1850, p. 293.

³ Cyst of Urachus, Glasgow Med. Journ., vol. xlv. 1896, p. 20.

afterwards. Bryant records a very similar case in a man aged thirty-five.

Cystic Dilatations and Tumours of the Urachus.—There can be no doubt that urine may escape out of the umbilicus through a urachal fistula, and that if the umbilicus be closed, it may dilate the urachus into a cyst, as in the examples above discussed. There also can be no doubt that primary dilatations of the urachal canal are not rare, and that they may never communicate with the bladder, even when they develop into formidable cystic tumours.

Cystic dilatations are common in men, and have been seen in many mammals where the parts concerned are homologous to those in man, that is to say, where the segment of allantois included within the body of the embryo is differentiated into urachus and bladder. In the course of my own operative practice I have seen many such dilatations. As a rule, they are elongated and not very wide, representing a short track of unobliterated canal. Sometimes they appear as spherical cysts from the first, and, as Wutz has shown, several cysts may be found in the same urachus, looking like a row of beads. This accounts for the multilocular urachal cysts sometimes met with. In the case where I was the operator, the lower loculus was so well developed that I took it for the bladder, until the catheter was passed and found to lie completely behind and below the loculus.

There is, therefore, no difficulty in understanding how a cystic tumour of the urachus may develop. Wutz was sceptical about large tumours described as urachal being really developed from the urachus at all. Here he went rather too far; but it cannot be doubted that others have been much too credulous.

Wutz showed conclusively that Hoffmann's tumour, in which fifty litres of fluid were found after death, was not extra-peritoneal, whilst the urachus was quite separate from it. Two other cases described by Hoffmann were clearly not urachal cysts. Heinecke's "urachal cyst" was an encapsuled peritoneal exudation. Roser's case was very obscure, Wolff's cyst was preperitoneal, and enucleated from the hypogastrium and left iliac fossa of a woman. Most likely it was an ovarian or broad-ligament cyst which had burrowed under the peritoneum.

Wutz detected the errors in the statements of the above observers, who thought that the cysts which they described were urachal. Hence his scepticism. Yet he is often quoted at second-hand as though he believed that the cysts were

urachial. Even now the surgeon who opens an encysted dropsy, and fails to recognise the diseased, thickened parietal peritoneum, is too apt to think that he has incised a urachal cyst.

On the other hand, Tait, Ill, Douglas, Bryant, Rotter, and myself have operated on cysts where anatomical relations, and even more reliable evidence, have shown that they were in all probability of urachal origin. In some cases the urachal cyst has been enucleated from the parietal peritoneum, which invested the whole of its posterior aspect. In most, the relations to the bladder and to the peritoneum and viscera were evident. In several, as in my own, the wall of the cyst was found to contain a regular layer of plain muscular fibres belonging either to the sheath, or more likely to the sub-epithelial connective tissue of the urachus.

The nature of the remarkable cysts described by Lawson Tait in 1887 remains conjectural.¹ He found enormous collections of fluid invested by a wall "as thick as sole-leather" (Byron Robinson). This wall was said in some cases to invest the pelvic viscera and lower abdominal viscera in place of the peritoneum. He suggested a theory to explain this appearance, or rather his interpretation of this appearance. The allantois, he believes, remains entirely enclosed within the foetus. The lower viscera push forward and make for themselves a serous investment of the allantois, so that there are allantoic broad ligaments and recto-uterine and utero-vesical pouches.

In the contribution to the "Medico-Chirurgical Transactions," to which I referred at the beginning of these notes, I entered into this remarkable subject at great length. I showed that Mr. Lawson Tait and Dr. Byron Robinson both admitted that this "allantoic cyst" doctrine was purely a theory which they had never proved by post-mortem evidence. I also showed that there were insuperable objections to the theory.

Thus the cyst-wall, "thick as sole-leather," which invested the pelvic viscera, was most likely peritoneum altered by tubercular disease. In operating upon patients afflicted with that malady, I have frequently seen a membrane "thick as sole-leather" occupying the site of the parietal and visceral peritoneum.

In fact, most of Mr. Tait's cases were examples, I suspect, of the ascitic type of tubercular peritonitis, or of encysted dropsy from some other form of peritonitis. The inflammatory

¹ See Tait, "Twelve Cases of Extra-Peritoneal Cysts," *British Gynaecological Journal*, vol. ii. 1887, p. 328; and Byron Robinson, "Cysts of Urachus," *Annals of Surgery*, vol. xiv. 1891, p. 337.

process had ceased, but the effusion for some reason was not absorbed. The after-histories of these cases are very defective. One or more were possibly urachal cysts developed from the urachus properly so called.

Mr. Tait was unable to be present and join in the discussion when the paper was read. In a letter written to me a month later he admitted that his theory was not proved, but insisted that my own theory was untenable. He remarked that I overlooked the fact that mature hair follicles were detected by the microscope in sections of the cyst-wall in one case. This I admit. But this fact suggests that the cyst was a universally adherent ovarian dermoid, or a dermoid tumour developed from some other abdominal organ. Bland Sutton detected fat like omentum in the contents of one of Tait's cysts. Free fat suggests dermoid cysts, whilst if it were really omentum the cavity must have been intraperitoneal, not the interior of a dilated urachus or allantois. Mr. Tait has recently operated on two or more similar cysts with excellent results. Here I must add that incision alone, or incision and drainage, cures the true urachal cyst, and very often, for reasons never made clear, cures cases of chronic tubercular peritonitis.¹ The effusion does not recur, and the uterus, previously fixed, soon becomes perfectly movable.

Surgical Treatment of Urachal Cysts.—In conclusion, let the surgeon when he comes upon a cystic tumour closely associated with the abdominal wall be sure of its relations. Parietal peritoneum may be so altered by chronic inflammation as to be easily mistaken for a cyst-wall. To take an encysted dropsy for a urachal cyst is not serious for the patient, as drainage cures both. On the other hand, whether a true urachal cyst be recognised or not, it is apt to degenerate into a urinary fistula, even when there is no communication with the bladder at the time of the operation. Hence the operator must be vigilant about after-treatment in cases where he opens or removes cysts closely related to the abdominal wall below the umbilicus. Ill, of Newark, New Jersey, describes a case where the surgeon overlooked this possibility. The patient came under Ill's care for a very bad urinary fistula.

When a urachal cyst is recognised and can be enucleated from the parietal peritoneum behind it, the detached serous membrane often requires trimming, as it is apt to slough. Care must be taken not to wound the bladder; sometimes a

¹ I find that it is best not to drain. In one case, where I operated and drained, there was discharge of cheesy material for months, though the patient got well at last. Without drainage convalescence is speedy.

portion of that organ has to be excised with the cyst. Rotter removed a tumour of the vesical mucous membrane together with a cyst of the urachus.

There was an instructive discussion on the treatment of the detached peritoneum at a meeting of the American Association of Obstetricians and Gynæcologists in 1897; it is published in that Association's Transactions, vol. x.¹ Dr. Vander Veer advocated bringing down the omentum and stitching it to the peritoneum, the vitality of the latter being thus ensured. Ill believes that enucleation of a urachal cyst from the peritoneum is dangerous even when feasible, and prefers incision and drainage, which answered very well in my own case. In one of his own patients there was a short track of patulous urachus between the cyst and the bladder. He wisely treated this track as though it were a vermiform appendix, cutting it very short, turning in the cut edges, and closing it with a Lembert suture. Simple ligature might have been followed by urinary fistula, as the ligatured mucous membrane would not have healed. Reed, of Cincinnati, was unable to enucleate a urachal cyst completely in two cases. He cut away much adherent peritoneum, and, to secure approximation of the edges, he separated the serous membrane for two inches behind the margin of the abdominal wound, and then made the edges meet without tension. He lays stress on uniting the peritoneum thoroughly, so that two broad surfaces of endothelium meet. This guards against urinary fistula. Macdonald, of Albany, and Cushing, of Boston, did not dread leaving the detached peritoneum. The same thing was done in nephrectomy and ligature of the common iliac artery. Douglas's case more probably died of sepsis from the fluid in the cyst than from sloughing of the peritoneum.

¹ This volume was published after the appearance of my memoir on a case of cyst of the urachus.

delagènière Henri. "Traité de l'uragie dilaté et de ses dérivés par la Résection et la Suture" Archives provinciales de Chirurgie 1892 (B. pamphlet) IV.)
Smit (J. A. Meerta) "Aansehen van de opening des urachus" 3 cases. Zeeblad. Tijdschrift van Geneesk. 1901/10
Opitz, "Urachus cyste mit Harnabscess" in einer vermiförmigen appendix. in "Beitrag zur Klinik der Harnwege" (3 lines) Zeeblad. Tijdschrift van Geneesk. 1905. p. 27.

Bondi, zur Kenntnis der "Kabelschlangen"
monatsschr. f. Geb. u. Gyn. Vol 21 (June 1905)
p. 724. This one was really a peritoneal cyst

Weiser "Cysts of the Urachus" Annals
of Surgery n^o 166 / Oct. 1906 / p 529. Tabulates
cyst 86 - many very imperfect & ducts corks are
included. Some (2 or 2, 8 or instance) are fistulous.
(See also abstract Journ. of Obst. & Gyn. Vol XI, p 191)

Eve (F.S.) described a large thick-walled urachal
cyst to the Mus. R. & S. in Dec. 1906 (Eve could not
publish it in time for my abstract of Weiser's case)

Selbre & Gotte. "Der Grosse Nys des de 'Duchenne'
Revue de Gynecologie, Vol 33, p 403 (1906) abstract
in Journal of Obstet. & Gyn. May 1907, p 435

Mérial Gazette des Hôpitaux n^o 20 1901
p. 112 "Anatomical Derivatives of the Urachus"
Medical Chronicle 1901 p. 64 (Merial's notebook
of Urachal Cysts)
Hottel, who made the abstract mentions cases of his own

Goenen & Charles Leotaurn, de malibical
fish bulb. Beitrag zur Anat. & Chirurgie Vol 58, p 163 (1902)
p. 710. Norder aged 49. Three paratubal kidneys -
a few very small of laminated cholesterine (egg
as big as a pigeon's egg) lay in a cavity behind
the umbilical fish bulb.

Morisson, Bulletin de la Soc. anat. de Paris Dec 1900
p. 1040.

Binnie, J. H. "Development of the Urachus"
Journ. Amer. Med Assoc. Vol 47 (July-Dec 1906, p 107)

For further references to dis. of urachus
see Clin. & Surg. Thompson's V. studies of
Urachal Cyst & simulating appendicular
abscess.